JC07 Rec'd PCT/PTO 09 JAN 2002

FORM PTO-1390 (REV 11-2000)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 35-224
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5) 10/030474 Unknown
INTERNATIONAL APPLICATION NO. **PCT/EP00/04675**	INTERNATIONAL FILING DATE **23 May 2000**	PRIORITY DATE CLAIMED **12 July 1999**

TITLE OF INVENTION

DATA STORAGE MEDIUM

APPLICANT(S) FOR DO/EO/US

LEIBER, J. et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The U.S. has been elected by the expiration of 19 months from the priority date (Article 31).
5. A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 To 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information. PTO-1449 and International Search Report

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
Unknown 10/030474	PCT/EP00/04675	35-224

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):

-- Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1040.00

-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $890.00

-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO $740.00

-- International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $710.00

-- International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00

CALCULATIONS PTO USE ONLY							
ENTER APPROPRIATE BASIC FEE AMOUNT =						$	890.00
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).						$	130.00
CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE			
Total Claims	9	-20 =	0	X	$18.00	$	0.00
Independent Claims	1	-3 =	0	X	$84.00		0.00
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)					$280.00	$	0.00
TOTAL OF ABOVE CALCULATIONS =						$	**1020.00**
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.							0.00
SUBTOTAL =						$	**1020.00**
Processing fee of $130.00, for furnishing the English Translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)). +							0.00
TOTAL NATIONAL FEE =						$	**1020.00**
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). **$40.00** per property +						$	0.00
Fee for Petition to Revive Unintentionally Abandoned Application ($1280.00 – Small Entity = $640.00)						$	0.00
TOTAL FEES ENCLOSED =						$	**1020.00**
						Amount to be: refunded	$
						Charged	$

a. ☒ A check in the amount of $1020.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 14-1140 in the amount of $_____ to cover the above fees. A duplicate copy of this form is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-1140. A duplicate copy of this form is enclosed.

d. ☒ The entire content of the foreign application(s), referred to in this application is/are hereby incorporated by reference in this application.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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NAME

25,327 REGISTRATION NUMBER

January 9, 2002 Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

LEIBER, J. et al.

Atty. Ref.: **35-224**

Serial No. **Unknown**

Group:

National Phase of: **PCT/EP00/04675**
International Filing Date: **23 May 2000**

Filed: **Herewith**

Examiner:

For: **DATA STORAGE MEDIUM**

* * * * * * * * * * * *

January 9, 2002

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to calculation of the filing fee and in order to place the above identified application in better condition for examination, please amend as follows:

IN THE SPECIFICATION

Page 1, after the title insert the following:

-- This application is the US national phase of international application PCT/EP00/04675 filed May 23, 2000 which designated the U.S. --.

IN THE CLAIMS

Please substitute the following amended claims for corresponding claims previously presented. A copy of the amended claims showing current revisions is attached.

5. (Amended) The data storage medium as claimed in claim 1, characterized in that the refractive index of the polymer film (11) can be changed locally by heating.

8. (Amended) The process as claimed in claim 7 for producing a data storage medium, the polymer film (30) being provided on one side with an adhesion layer (32) which faces outward when the polymer film (30) is wound on the winding body (34; 40).

9. (Amended) The use of the data storage medium as claimed in claim 1 in a drive which is attuned to it and comprises a read device (2) and, optionally, a write device (2), the read device (2) and the optional write device (2) being disposed in the recess (36) in the central area of the data storage medium (1) and being moved relative to the data storage medium (1), while the data storage medium (1) is stationary, for the purpose of reading and/or writing information.

REMARKS

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**."

The above amendments are made to place the claims in a more traditional format.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

5. (Amended) The data storage medium as claimed in [any of claims 1 to 4] claim 1, characterized in that the refractive index of the polymer film (11) can be changed locally by heating.

8. (Amended) The process as claimed in claim 7 for producing a data storage medium [as claimed in claim 3], the polymer film (30) being provided on one side with an adhesion layer (32) which faces outward when the polymer film (30) is wound on the winding body (34; 40).

9. (Amended) The use of the data storage medium as claimed in [any of claims 1 to 6] claim 1 in a drive which is attuned to it and comprises a read device (2) and, optionally, a write device (2), the read device (2) and the optional write device (2) being disposed in the recess (36) in the central area of the data storage medium (1) and being moved relative to the data storage medium (1), while the data storage medium (1) is stationary, for the purpose of reading and/or writing information.

Data storage medium

The invention relates to a data storage medium having an optical information carrier which comprises a spiral-wound polymer film.

DE 298 16 802 describes a data storage medium having an information carrier, wound in a plurality of plies onto a winding core in a spiral fashion, for optically readable information units. The information carrier may comprise a polymer film, with an adhesion layer being located between each pair of adjacent plies. Information can be written to this data storage medium by locally heating the polymer film by means of a write beam of a data drive, as a result of which the refractive index and thus the reflecting power (reflectivity) change locally at the interface of the polymer film. This may be detected by means of a read beam in the data drive. By focussing the write beam or read beam, information may be specifically written to or read from a preselected ply of the information carrier. The winding core may be optically transparent and may have a recess in its central area that serves to accommodate the read/write device of a data drive. The read/write device is moved relative to the data storage medium, while the data storage medium is stationary, so that the data storage medium need not be balanced to take account of a rapid rotational motion.

In the existing data storage medium, the winding core is a disruptive factor, since its optical quality is inadequate unless it is manufactured with a high degree of elaborateness. Since, when the data storage medium is used in a data drive whose read/write device is situated in the recess of the winding core, the winding core is required to transmit a beam a number of times during each read operation, inadequate optical quality has particularly unfavorable consequences.

It is an object of the invention to improve the existing data storage medium such that no problems arise as a consequence of inadequate optical quality of a winding core and yet the data storage medium can be manufactured economically.

This object is achieved by means of a data storage medium having the features of claim 1. Claim 7 specifies a process for producing a data storage medium of this kind. Claim 9 relates to the use of such a data storage medium in a drive that is attuned to it. Advantageous embodiments of the invention follow from the dependent claims.

The data storage medium of the invention has an optical information carrier which comprises a spiral-wound polymer film. The central area of the data storage medium is provided with a recess whose periphery is formed by the innermost winding of the polymer film. Accordingly, the data storage medium contains no separate winding core such as is the case with the existing data storage medium.

The reading of information or data from the data storage medium of the invention and - if the data storage medium is set up for the input of data by the user - the writing of information to the data storage medium is therefore not hindered by a winding core. Accordingly, the data storage medium of the invention is particularly suitable for use in a drive in which a read device and an optional write device are arranged in the recess in the central area of the data storage medium.

Preferably, the polymer film is wound in a plurality of polymer film plies through which information can be read from a preselected polymer film ply and, optionally, can be written to a preselected polymer

film ply. There may be an adhesion layer between each pair of adjacent polymer film plies in order to fix the polymer film plies to one another. For example, from 10 to 30 polymer film plies may be wound atop one another, or else a greater or lesser number. At a polymer film thickness of between 10 µm and 100 µm, preferably below 50 µm or around 35 µm, the information on different polymer film plies can be separated from one another with good resolution by means, for example, of read/write devices which are known from DVD technology. An adhesion layer may, for example, have a thickness in the range between 1 µm and 40 µm, preferably below 25 µm or around 2 µm. A suitable adhesion agent comprises, for example, an acrylate adhesive which is free from air bubbles and which is crosslinked, for example, chemically or by irradiation with UV or electron beams. With a multi-ply data storage medium construction of this kind, it is possible to achieve a very high storage density. Furthermore, even without a winding core, the mechanical stability is sufficient and may be increased further, for example, by inserting the data storage medium into an outer sleeve. Slight deviations of the wound polymer film from an ideal spiral form, such as might arise, for example, in the absence of a winding core by deformation of the windings of the polymer film, are not disruptive to the reading and/or writing of data, since the focus of a read beam and/or of a write beam may be tracked without any problems in order to remain in a preselected ply of the information carrier. If the read device and the optional write device are disposed in the recess in the central area of the data storage medium and are moved relative to the data storage medium in order to read and/or write information, while the data storage medium is stationary, even any possible imbalance in the data storage medium is irrelevant.

Preferably, the refractive index of the adhesion layer differs only slightly from the refractive index of the

polymer film, in order to minimize disruptive reflections of the read beam or of the write beam at a boundary between a polymer film ply and an adjacent adhesion layer. It is particularly advantageous if the difference in the refractive indices is less than 0.005. Any difference in the refractive indices may, however, be utilized for the purpose of formatting the data storage medium.

In one preferred embodiment of the data storage medium of the invention, the refractive index of the polymer film can be changed locally by heating. Suitable material for the polymer film comprises, for example, polymethyl methacrylate (PMMA) or biaxially oriented polypropylene (BOPP). If polypropylene, following extrusion to the film, is pretensioned in two planes, a high inherent energy is stored in the material. In the case of local heating, by means of a write beam, for example, there is a severe change in the material by reformation, and this is so even when a relatively small amount of energy is deposited per unit area. In this way it is possible, for example, to achieve a change in refractive index of approximately 0.2 over an area for one stored information unit with a diameter or side length of approximately 1 µm, and this is readily detectable by means of a read beam.

The polymer film may be assigned an absorber which is set up at least partly to absorb a write beam and to emit the generated heat at least partly, locally, to the polymer film. The absorber comprises, for example, dye molecules which are present in the polymer film or in an adhesion layer adjacent to the polymer film, and permits local heating of the polymer film, sufficient to change the refractive index, for a relatively low write beam intensity.

The data storage medium of the invention may be produced by winding the polymer film spirally onto a

winding body and subsequently withdrawing the winding body from the central area of the data storage medium. If there is to be an adhesion layer between each pair of adjacent polymer film plies, then in one advantageous embodiment of the process the polymer film is provided on one side with an adhesion layer which faces outward when the polymer film is wound onto the winding body. The adhesion layer is therefore unable to bond to the winding body, so that at the end of the winding operation the winding body can be withdrawn without any problems from the central area of the data storage medium. When the winding operation has been concluded, the outward-facing adhesion layer on the outermost polymer film ply may be covered with an additional, nonadhering material ply or else, for example, may be removed by means of a solvent or rendered nonadhesive by chemical or physical treatment. In this way, a data storage medium of the invention can be produced economically.

In the text below, the invention is elucidated further with reference to embodiment examples. The drawings show, in

Figure 1, a data storage medium of the invention which comprises a spiral-wound polymer film, in diagrammatic perspective representation, parts of a drive attuned to the data storage medium being arranged in a recess in the central area of the data storage medium;

Figure 2, a diagrammatic side view of a process step in the production of a data storage medium of the invention,

Figure 3, a diagrammatic cross section through the central area of a data storage medium of the invention, and

Figure 4, a diagrammatic cross section through the central area of a data storage medium of the invention in the course of a process step according to another embodiment of the production process.

Figure 1 shows in diagrammatic representation a data storage medium 1 and a read/write device 2 of a drive attuned to the data storage medium 1. The data storage medium 1 comprises a number of plies 10 of a polymer film 11 which serves as information carrier and is wound spirally. The design of the central area of the data storage medium 1 is described in more detail later on with reference to figure 3. For ease of illustration, the individual plies 10 of the polymer film 11 have been shown in figure 1 as concentric rings, although the plies 10 were formed by spiral winding of the polymer film 11. Between each pair of adjacent plies 10 of the polymer film 11 there is an adhesion layer 12. For reasons of clarity, the adhesion layers 12 have been drawn in figure 1 in an increased thickness which is not to scale.

In the embodiment example, the polymer film 11 consists of biaxially oriented polypropylene and has been pretensioned in both surface directions prior to winding. In the embodiment example, the polymer film 11 has a thickness of 35 µm; other thicknesses in the range from 10 µm to 100 µm or even thicknesses lying outside of this range are likewise conceivable. The adhesion layers 12 are free from gas bubbles and in the embodiment example consist of acrylate adhesive, to which an absorber dye has been admixed, at a thickness of 23 µm, preferred layer thicknesses being between 1 µm and 40 µm. In the embodiment example, the data storage medium 1 contains twenty plies 10 of the polymer film 11 and has an external diameter of approximately 30 mm. Its height is 19 mm. A different number of plies 10, or different dimensions, are

likewise possible. The number of windings or plies 10 may, for example, be between ten and thirty, or else may be greater than thirty.

The read/write device 2 arranged in a recess in the central area of the data storage medium 1 comprises a read/write head 20 which can be moved backward and forward axially and rotated in the directions of the arrows that have been drawn in, by means of a mechanism 21. The read/write head 20 has optical elements by means of which a light beam (of wavelength, for example, 630 nm or 532 nm) produced by a laser, which is not shown in figure 1, may be focussed onto the individual plies 10 of the polymer film 11. Since the read/write head 20 is moved by means of the mechanism 21, it is able to scan fully all plies 10 of the data storage medium 1. In the embodiment example, the data storage medium 1 is stationary. Consequently, it does not need to be balanced to take account of a high rotational speed (and also need not be unwound or rewound), unlike the read/write head 20. For the sake of clarity, the elements provided for balancing the read/write head 20 have not been shown in figure 1. The laser mentioned is located outside of the read/write head 20 and is stationary; the laser beam is guided into the read/write head 20 via optical elements.

In the embodiment example, the laser is operated with a beam power of approximately 1 mW for the purpose of storing or writing information to the data storage medium 1. The laser beam serves here as a write beam and is focussed onto a preselected ply 10 of the polymer film 11, in such a way that the beam spot is smaller than 1 µm, the light energy being introduced in the form of short pulses of approximately 10 µs in duration. The energy of the write beam is absorbed in the beam spot, promoted by the absorber in the adjacent adhesion layer 12, leading to a local heating of the polymer film 11 and thus to a local change in the

refractive index and in the reflectivity.

In order to read stored information from the data storage medium 1, the laser is operated in continuous wave mode (CW mode). The read beam focussed onto the desired site is reflected as a function of the stored information, and the intensity of the reflected beam is detected by a detector in the read/write device 2.

The data storage medium may also be of an embodiment which cannot be written by the user. In this case, it contains information units written by the manufacturer. In this case, there is no need for a write function in the user's data drive.

In the polymer film 11, the information units are formed by changing the optical properties in a region having a preferred size of less than 1 µm. The information may be stored in binary form; i.e., the local reflectivity adopts only two values at the site of one information unit. In other words, if the reflectivity is above a fixed threshold value, a "1", for example, is stored at the site in question on the information carrier, and, if it is below this threshold value or below a different, lower threshold value, a "0" is correspondingly stored. It is, however, also conceivable for the information to be stored in a plurality of gray stages. This is possible if the reflectivity of the polymer film at the site of an information unit can be changed specifically by defined adjustment of the refractive index without saturation being reached.

Figure 2 illustrates a process step during the production of the data storage medium 1. The starting material is a polymer film made of biaxially oriented polypropylene, which is designated 30 here. On one side, the polymer film 30 has been provided with an adhesion layer 32 of acrylate adhesive. In order to

produce the spirallike structure of the information carrier, the polymer film 30 is laid against a cylindrical winding body 34, whose cross section can be seen in figure 2. The adhesion layer 32 faces outward. The winding body 34 is then rotated until the polymer film 30 has been wound up fully with the adhesion layer 32. This produces the plies - designated 10 in figure 1 - of the polymer film 30, with the adhesion layer 32 forming the respective adhesion layers 12 between each pair of adjacent polymer film plies 10. Finally, the winding body 34 is withdrawn in the axial direction. Since the adhesion layer 32 faces outward during winding, there is no adhesion agent between the surface of the winding body 34 and the innermost winding of the polymer film 30; otherwise, the withdrawal of the winding body 34 would be made more difficult.

Figure 3 shows the central area of the data storage medium 1 in a diagrammatic cross-sectional view. The two inner windings of the polymer film 30 are shown, with the adhesion layer 32. For ease of illustration, the thicknesses of the polymer film 30 and of the adhesion layer 2 have been drawn in excessively large in comparison to the diameter of the inner windings, and this applies in a similar way to figure 2 as well. Following the withdrawal of the winding body 34, a recess 36 is formed in the central region of the data storage medium 1, the periphery 37 of said recess 36 being formed by the innermost winding 38 of the polymer film 30. Accordingly, when the data storage medium 1 is used, there is, as illustrated by figure 1, no disruption by a winding core which would otherwise have to be penetrated once by a write beam emitted by the read/write device 2 and twice, indeed, by a read beam emitted by the read/write device 2 and received following reflection. Furthermore, at the periphery 37 there is no adhesion material, which might, for example, have a tendency to become soiled.

When the polymer film 30 has been fully wound, the adhesion layer 32 on the outside of the outermost winding may be removed or covered, where necessary. It is also conceivable to insert the finished wound body into a sleeve in order to achieve better stability.

The form of the inner windings of the polymer film 30 as shown in figure 3 results when the film is wound onto the cylindrical winding body 34 (see figure 2). The fact that this form does not correspond to the course of an ideal spiral is a result of the fact that, at the beginning of the second winding, the polymer film 30 has to be displaced radially outward in a more or less abrupt way if it lies against the free end 39 of the polymer film 30. This deformation continues outward, but affects the inner windings in particular.

Better results are achieved with a winding body 40 as depicted in figure 4. The winding body 40 has, in cross section, a spirallike outer contour 42 with a step 44 whose radial projection corresponds to the thickness of the polymer film 30 plus the thickness of the adhesion layer 32. As figure 4 illustrates, the spirallike outer contour 42 guides the starting area of the second winding of the polymer film 30 undisruptedly beyond the area at the free end 39 of the polymer film 30 which lies against the step 44, in the course of the winding operation. Otherwise, the process illustrated by figure 4 for producing a data storage medium 1 proceeds in exactly the same way as the process elucidated in connection with figure 2. As previously, the representation according to figure 4 is also not to scale. Following the withdrawal of the winding body 40, the windings of the polymer film 30 run substantially as in the case of an ideal spiral.

Claims

1. A data storage medium having an optical information carrier which comprises a spiral-wound polymer film (11, 30), the central area of the data storage medium (1) being provided with a recess (36) whose periphery (37) is formed by the innermost winding (38) of the polymer film (30).

2. The data storage medium as claimed in claim 1, characterized in that the polymer film (11) is wound in a plurality of polymer film plies (10) through which information can be read from a preselected polymer film ply (10) and, optionally, written to a preselected polymer film ply (10).

3. The data storage medium as claimed in claim 2, characterized in that there is an adhesion layer (12) between each pair of adjacent polymer film plies (10).

4. The data storage medium as claimed in claim 3, characterized in that the refractive index of the adhesion layer (12) differs only slightly from the refractive index of the polymer film (11).

5. The data storage medium as claimed in any of claims 1 to 4, characterized in that the refractive index of the polymer film (11) can be changed locally by heating.

6. The data storage medium as claimed in claim 5, characterized in that the polymer film (11) is assigned an absorber which is set up at least partly to absorb a write beam and to emit the generated heat at least partly, locally, to the polymer film (11).

7. A process for producing a data storage medium as

claimed in claim 1, the polymer film (30) being wound spirally onto a winding body (34; 40) and the winding body (34; 40) subsequently being withdrawn from the central area of the data storage medium (1).

8. The process as claimed in claim 7 for producing a data storage medium as claimed in claim 3, the polymer film (30) being provided on one side with an adhesion layer (32) which faces outward when the polymer film (30) is wound on the winding body (34; 40).

9. The use of the data storage medium as claimed in any of claims 1 to 6 in a drive which is attuned to it and comprises a read device (2) and, optionally, a write device (2), the read device (2) and the optional write device (2) being disposed in the recess (36) in the central area of the data storage medium (1) and being moved relative to the data storage medium (1), while the data storage medium (1) is stationary, for the purpose of reading and/or writing information.

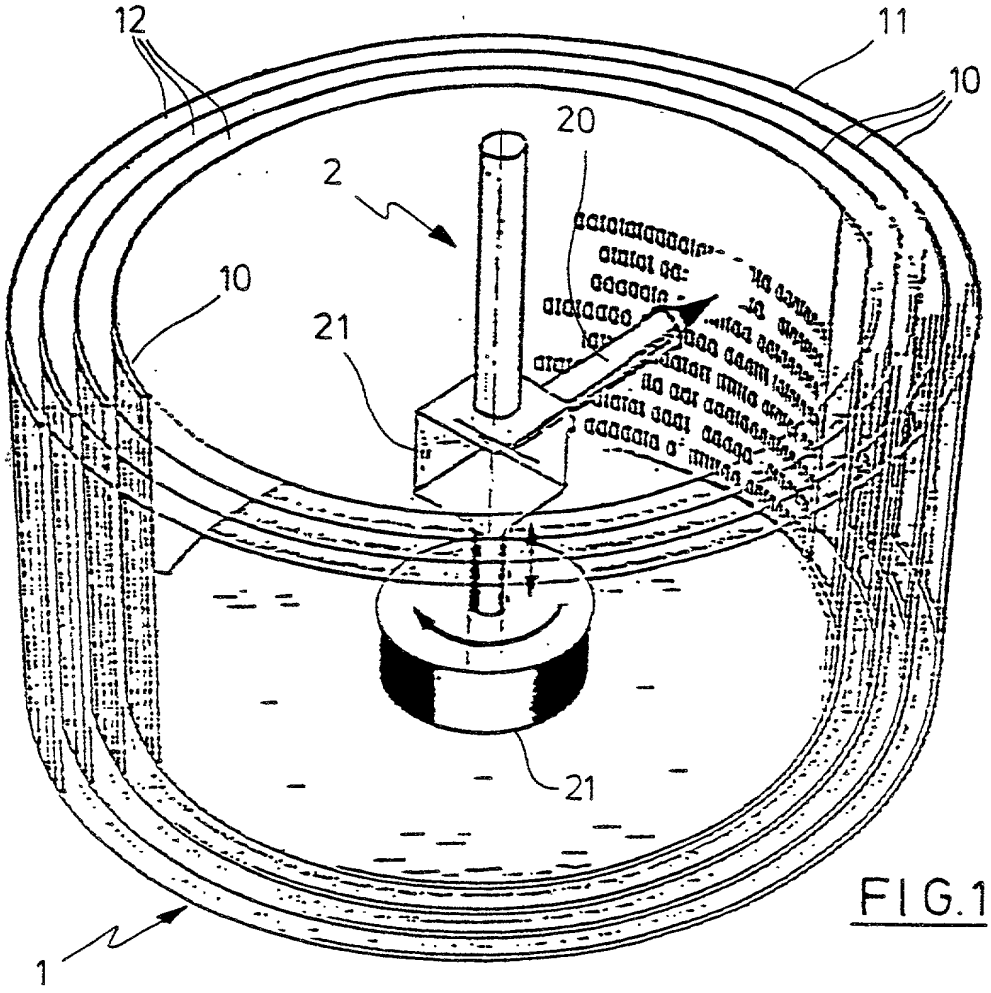

FIG.1

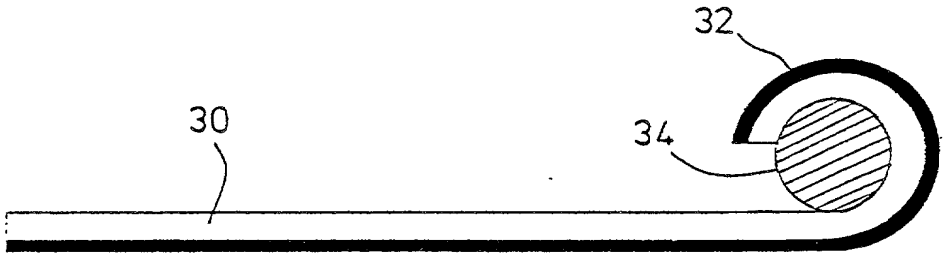

FIG.2

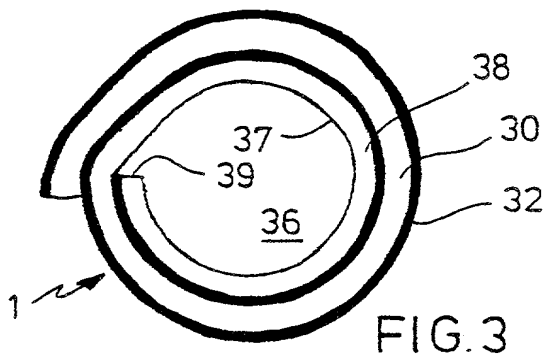

FIG.3

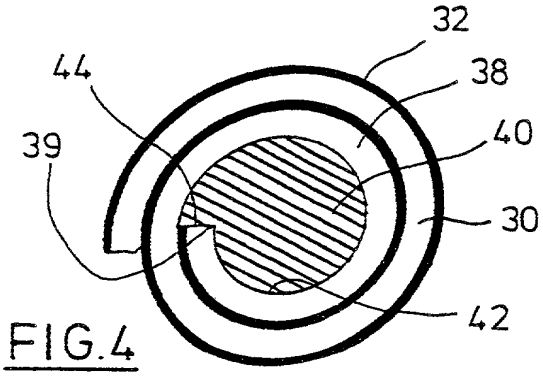

FIG.4

RULE 63 (37 C.F.R. 1.63)
INVENTORS DECLARATION FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, mailing address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DATA STORAGE MEDIUM

the specification of which (**check** applicable **box(s)**):

☐ is attached hereto
☐ was filed on _____ as U.S. Application Serial No. _____ (Atty Dkt. No. 35-224)
☒ was filed as PCT International application No. PCT/EP00/04675 on 23/05/2000
and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose to the Patent Office all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed, before the filing date of this application:

Priority Foreign Application(s):

Application Number	**Country**	**Day/Month/Year Filed**
199 32 900.1	DE	12/07/1999

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below.

Application Number	**Date/Month/Year Filed**

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed above or below:

Prior U.S./PCT Application(s): Application Serial No.	**Day/Month/Year Filed**	**Status: patented pending, abandoned**
PCT/EP00/04675	23/05/2000	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. And on behalf of the owner(s) hereof, I hereby appoint **NIXON & VANDERHYE P.C., 1100 North Glebe Rd., 8th Floor, Arlington, VA 22201-4714, telephone number (703) 816-4000 (to whom all communications are to be directed)**, and the following attorneys thereof (of the same address) individually and collectively owner's/owners' attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent: Larry S. Nixon, 25640; Arthur R. Crawford, 25327; James T. Hosmer, 30184; Robert W. Faris, 31352; Richard G. Besha, 22770; Mark E. Nusbaum, 32348; Michael J. Keenan, 32106; Bryan H. Davidson, 30251; Stanley C. Spooner, 27393; Leonard C. Mitchard, 29009; Duane M. Byers, 33363; Jeffry H. Nelson, 30481; John R. Lastova, 33149; H. Warren Burnam, Jr. 29366; Mary J. Wilson, 32955; J. Scott Davidson, ~~33489;~~ Alan M. Kagen, 36178; Robert A. Molan, 29834; B. J. Sadoff, 36663; James D. Berquist, ~~34776;~~ Updeep S. Gill, 37334; Michael J. Shea, 34725; Donald L. Jackson, 41090; Michelle N. Lester, 32331; Frank P. Presta, 19828; Joseph S. Presta, ~~35329;~~ Joseph A. Rhoa, 37515; Raymond Y. Mah, 41426; Chris Comuntzis, 31097; Gary T. Tanigawa, 43180. I also authorize Nixon & Vanderhye to delete any attorney names/numbers no longer with the firm and to act and rely solely on instructions directly communicated from the person, assignee, attorney, firm, or other organization sending instructions to Nixon & Vanderhye on behalf of the owner(s).

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☒ *See attached sheet(s) for additional inventor(s) information!!*

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Serial No.

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FOR ADDITIONAL INVENTORS, check box ☐ and attach sheet with same information and signature and date for each.